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**User Manual
Fast Test Sub
117-2349-HH0**



User Manual Fast Test Sub 117-2349-HH0

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Revision History

Issue, Release Date	Description
Rev A, 19 Jun 08	Initial Issue
Rev B, 18 May 11	Parts List Updated for Alternative Isolation Valve (Item 5)
Rev C, 05 Jul 11	Isolation valve Pt No 190-1871 Removed from Parts List
Rev D, 30 Jan 12	Parts list updated
Rev E, 31 Jan 12	Illustrations updated to reflect valve with single O-Ring

Safety

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

All pressure equipment has a particular pressure rating and care must be taken to ensure that no item is used in a situation that may cause its working pressure to be exceeded.

All personnel involved in pressure testing must be formally trained, competent and utilising the appropriate PPE.

Safe Lok devices, where fitted, should be checked for positional security to avoid unnecessary movement of the collar

Ensure the identification band/plate is fitted and is displaying the correct information as per the Tag Sheet/Index

This equipment and the equipment it is attached to is heavy never position yourself below a suspended load

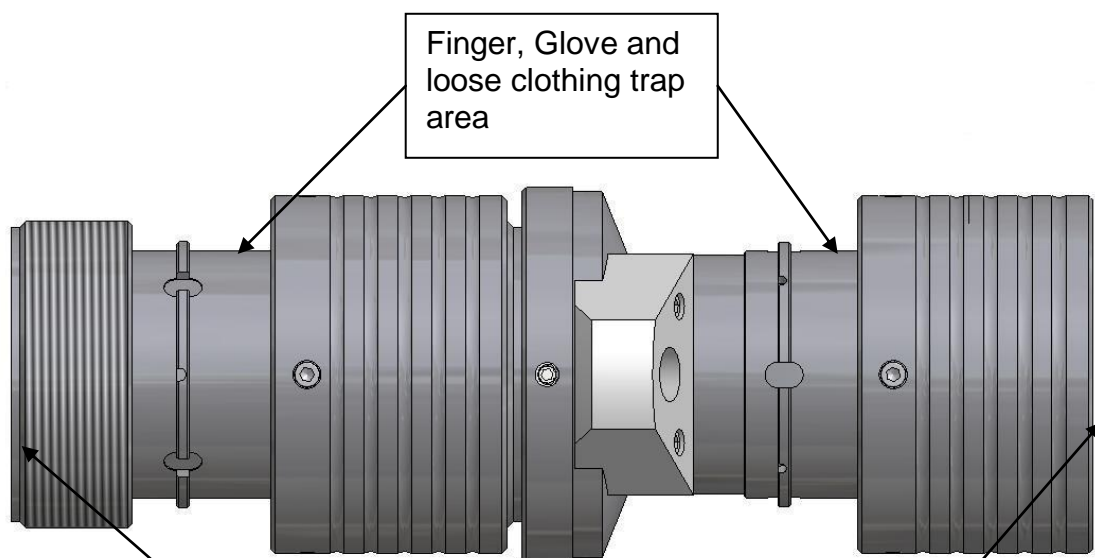


Figure 1 : Fast Test Sub Safety



1 Introduction

1.1 General

The Phuel Fast Test Sub is designed to save rig time while pressure testing the pressure control string when multiple wireline runs are required. The Fast Test Sub is inserted into the riser/lubricator at the position of the joint that is normally opened to insert or retrieve the tool string. After performing the first pressure test to check the integrity of the whole string, subsequent pressure tests can be made at the Fast Test Sub to verify the integrity of the only joint that was disconnected, rather than having to test the whole assembly. This is achieved by connecting a small hydraulic hand pump to pressure test between two seals from the outside. It is estimated that the use of the Fast Test Sub can reduce the time needed to pressure test by more than 30 minutes.

The Fast Test Sub body is constructed in two parts that are connected by a collar. When the collar is backed off the two parts can be separated to break into the riser string. Both of the collars are Otis type with the Phuel safe-lok feature incorporated as standard. The test port is replaceable (saver sub) and can also be isolated from the well pressure by closing a metal seal valve.

This user manual serves as an introduction to the equipment and contains the relevant specifications, operation, planning and maintenance instructions, parts list and drawings.

1.2 Product Identification

Phuel products are identified by a unique serial number that facilitates full product traceability. Each product is supplied with a documentation pack that contains product certification and material/inspection reports. The serial number is always etched on the surface of the product but can sometimes be difficult to find or read after painting.

A stainless steel band secures the nameplate tag that is stamped with the information shown. This tag should be located in the first instance to ensure that this manual refers to the correct equipment. A customer identification number is also included to allow the customer to track the asset in their system.

PHUEL OIL TOOLS LTD
DESCRIPTION & SIZE
CUSTOMER ID No
PHUEL ID No 06-XXX-XX
MWP & SERVICE
TEST DATE

2 Technical Specification

Part No	117-2349-HH0
Connection	9 – 4 Otis Type Connection ½" NPT
Maximum Working Pressure	10,000 Psi
Test Pressure	15,000 Psi
Service	H2S
Weight	394 lbs/179 Kg
Overall Length (A)	31.85"/0.81M
Make Up Length (B)	29.17"/0.74M
Inner Diameter	5.13"/0.13M

Table 1 : Technical Data

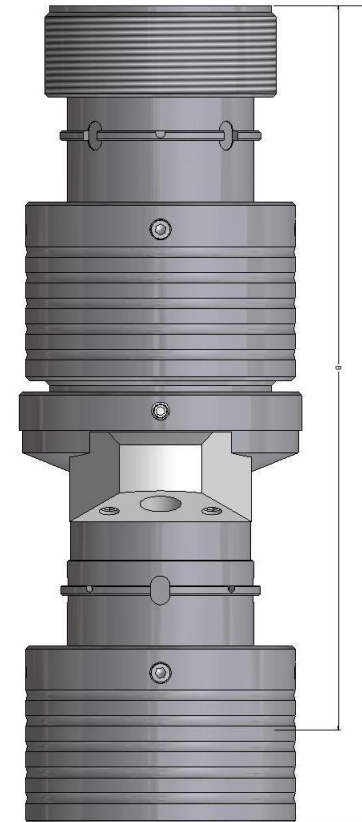


Figure 2 : Fast Test Sub

3 Technical Description

3.1 The Fast Test Sub

The Fast Test Sub provides a single connection in the riser string that can be broken and then made up and tested without the need to pressure test the whole string, thus reducing the operational time required to install tools in the well.

The figure below shows the operational sequence for the fast test sub. Notice that the seals are not exposed when the sub is separated, which helps avoid damage when stabbing back in.

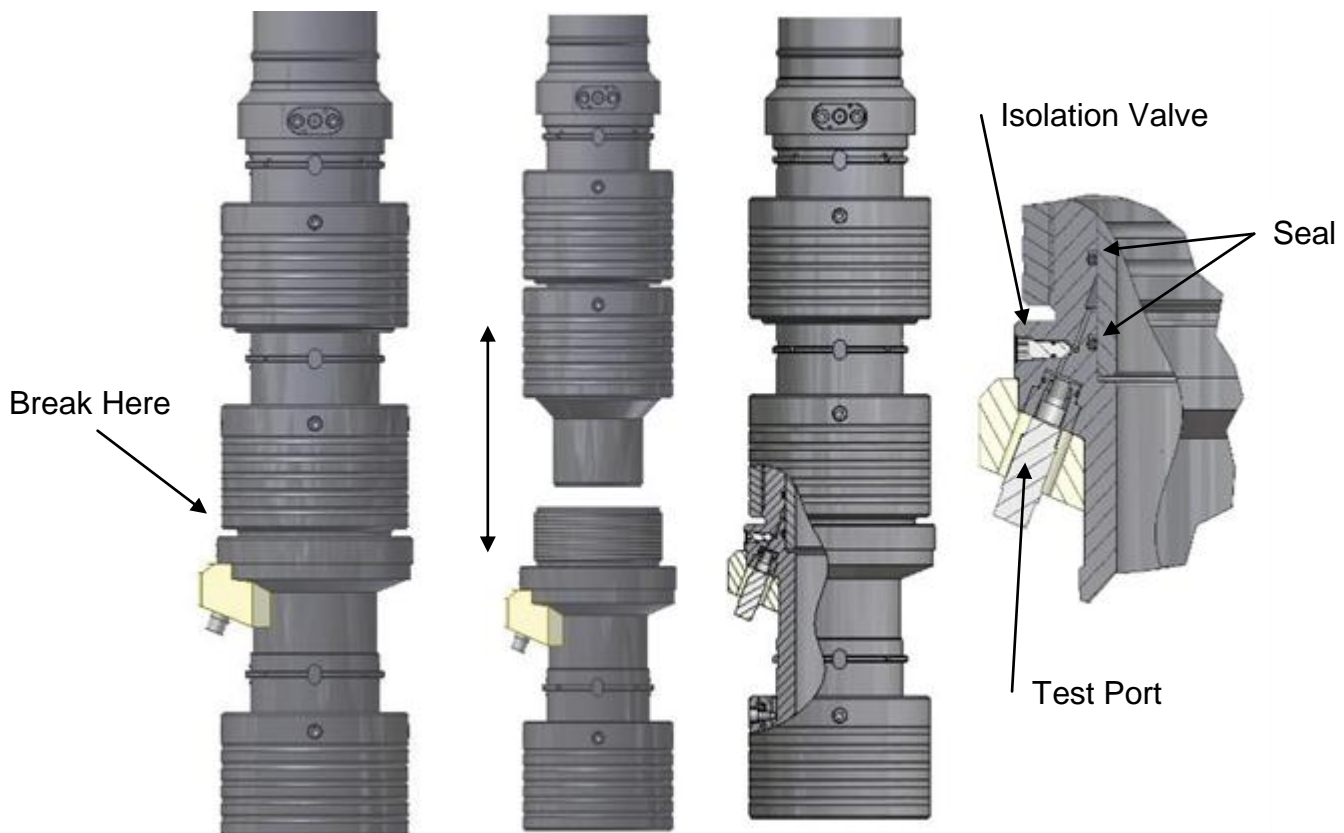


Figure 3: The operation of the Fast Test Sub

3.2 The Isolation Valve

The isolation valve is located at the test port and consists of a metal-to-metal cone seal that is energised by tightening the valve with a suitable hexagonal key. The valve should be open (i.e screw backed out) when testing between the o-rings and closed (screwed in) when wishing to isolate from the well pressure. The circlip prevents the full removal of the valve.

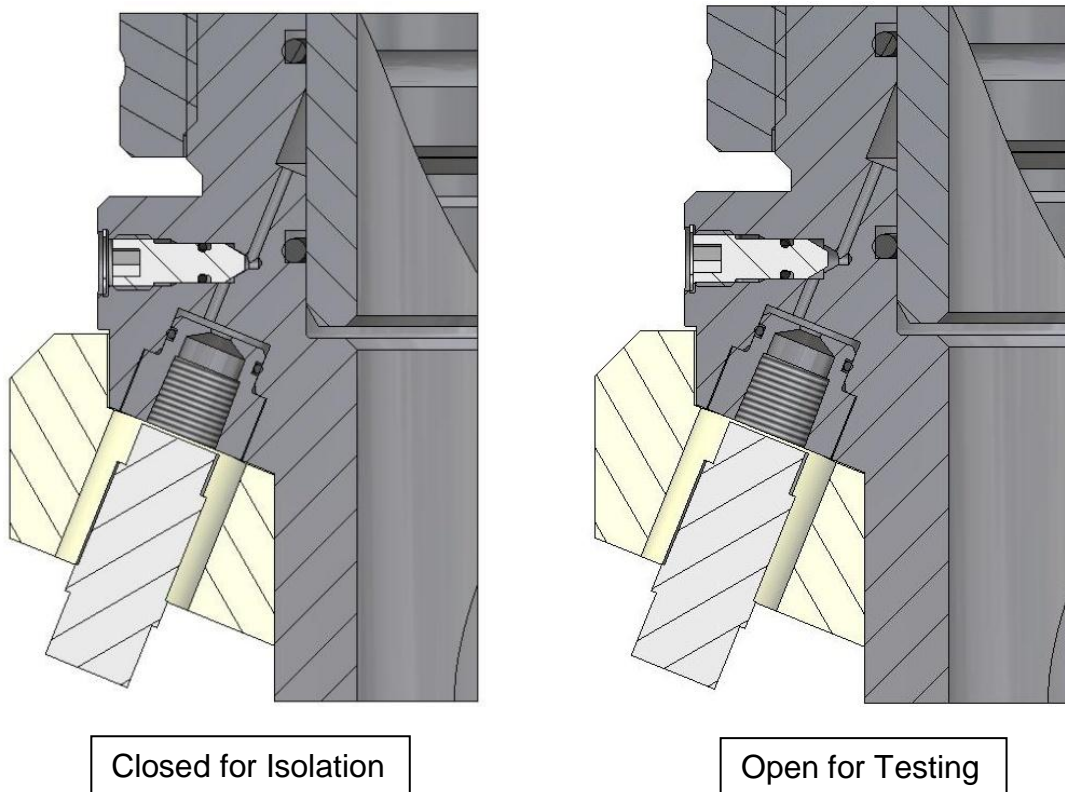


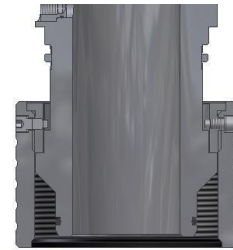
Figure 4: Isolation Valve

3.3 Collar Safe-Lok

The safe collar lock is designed to provide safe handling of the union collars. In addition it can be used to prevent accidental back off of the collar. The following shows the sequence for correct operation.

3.3.1 Preparing the Safe-Lok Collar

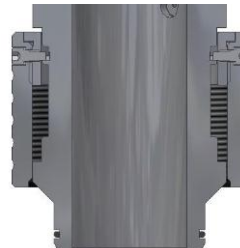
After removing the thread protector the collar will be set in the lower position and must be moved to the high position before making up the connection.



With both hands raise the collar ensuring the Stop Pins go through the gaps in the raised rim



Rotate the collar through 90° and gently lower onto the raised rim. Ensure collar rests into the grooved area



3.3.2 Making up the Safe-Lok Collar

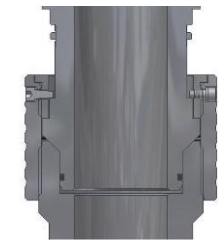
Lift and stab the pin into the mating box and check that there are no signs of damage to the o-ring (caused by being misaligned while stabbing in).



With both hands raise the collar clear of the grooved area on the raised rim and rotate through 90°. Lower the collar until it reaches the top of the threads. Turn the collar anticlockwise until the start of the thread is found and then start turning clockwise to make up the collar to the box thread. When almost made up fully release the plungers from the locked open position.



Tighten the collar down.



3.3.3 Breaking the Safe-Lok Collar

Unscrew the collar completely



Lift the collar up, ensure the stop pins go through the gaps in the raised rim. Rotate the collar 90° and lower gently so that the pins rest in the grooved portion of the raised rim.



The connection can now be separated without any risk of dropping the collar.

3.4 Test Port Saver Sub

The saver sub provides the ability to change a damaged pressure fitting without repairing or replacing a major component. The saver sub is held in place by two socket head cap screws and is sealed by means of an o-ring.

With the Fast Test Sub the saver block may be covered by the protector, which is designed to prevent damage to the connected fitted when the tool is lying on the deck.

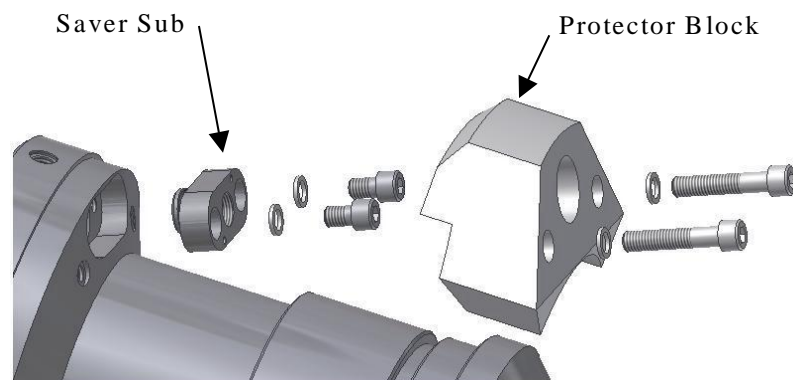


Figure 5 : NPT Test Port and Saver Sub

4 Operation

All operations to be carried out by suitably qualified and competent personnel

4.1 Setting up

1. Locate the Fast Test Sub at the point in the riser where the connection will be broken to facilitate the insertion or removal of the tool string (normally immediately above the wireline valve).
2. Attach the male part of the quick release fitting to the Fast Test Sub with the mating part on the test hose assembly. Attach the test hose at this time.
3. Open the isolation valve.

4.2 Separating

1. Secure a lifting clamp to the top of the riser.
2. Close the isolation valve and ensure the test hose is detached
3. Back off the safe-lok collar and lock in the high position.
4. Lift the riser upwards 6-8 inches so that the two parts are clear of each other.
5. Lower the riser complete with the top half of the Fast Test Sub and change the tool string

4.3 Joining

1. Check the inside of the Fast Test Sub to ensure that the o-rings are in place and are in good condition – change if necessary.
2. Before lifting the riser ensure that the collar for the fast test sub is still set in the high position.
3. Position the top half of the Fast Test sub with the riser over the connection and slowly stab in ensuring that the string is as vertical as possible. Ensure that the sub is fully engaged.
4. Lower the collar and make up.
5. Attach the test hose

4.4 Testing

1. Close the isolation valve by tightening the valve as far as possible
2. Apply 3000 psi pressure then open isolation valve and confirm there is a significant drop in pressure
3. Apply pressure to the test line – bleed of a few times to minimise the amount of trapped air.
4. Apply the test pressure of 1.2 x maximum expected well pressure (or 10,000 psi) and hold for 10 minutes. No leaks acceptable. If leaks occur then the joint will need to be separated again the o-rings changed

5. Bleed off the pressure
6. Close the isolation valve and detach the test hose

4.5 Pre Job

- Ensure thread protectors are fitted
- Check maintenance record sheet and ensure the equipment has been maintained by competent personnel
- Check all certification is in date
- Confirm information band is fitted and correct
- Ensure equipment is suitable for the maximum working pressures and services involved
- Ensure 'O' ring is seated correctly and there are no signs of damage
- Ensure threads are clean
- Inspect for signs of damage
- Pressure test to 1.2x the maximum well pressure
- Carry out a collar lock test and ensure correct operation
- Ensure all connections are tight and that the test port is tightly fitted
- Ensure that spare o-rings are available and sent with the equipment.
- Ensure isolation valve is moving freely

4.6 During Job

- Ensure collar lock has operated correctly and the collar is locked in position
- Avoid excessive movement of the riser string

4.7 Post Job

- Inspect for signs of damage and report any findings
- Ensure threads are cleaned and the re-greased
- Ensure thread protectors are fitted

5 Maintenance

All maintenance to be carried out by suitably qualified and competent personnel

5.1 Introduction

Regular maintenance of the equipment using Phuel redress kits or Phuel approved parts is essential to its continued safe operation. Ensure that the pre and post job operating procedures are followed and that maintenance records are kept.

5.2 Schedule

The maintenance schedule may be governed by international or company standards and the following is considered to be the minimum requirements.

5.2.1 Pre & Post Job

Refer to Section 4.5 and Section 4.7 for details

5.2.2 Yearly

- Disassemble fast test sub (5.5.1) clean and degrease all components
- Inspect the condition of all sealing surfaces and surface coatings
- Re-coat threads and sealing surfaces if necessary. If in doubt contact Phuel Oil Tools Ltd
- Replace all elastomeric seals with items from redress kit (Table 4)
- Re-grease components
- Re-assemble (5.5.2)
- Pressure test to maximum working pressure
- Inspect paint work and repair as necessary

5.2.3 Five Yearly

- Yearly Maintenance (plus the following)
- Carry out 100% surface NDE on all surfaces
- Pressure test to test pressure witnessed by certifying authority

5.3 Safety

- Many of the components are heavy and should not be lifted without lifting aids
- Wear appropriate personal protective equipment
- Do not over exert yourself while using torque wrenches. Use appropriate mechanical advantages when available.

- Ensure that all tools and equipment are in good condition and are suitable for the intended use.

5.4 Tools

The following tools are required:

- 2 x Memac Chain Wrench (No3 with 14" chain)
Other pipe wrenches may be used but will mark equipment
- 3/8 hex Allen key
- 5/16 hex Allen key
- 1/2" Spanner
- 7/8" Spanner (If NPT plug to be fitted)
- Circlip pliers
- Wire brush

5.5 Redress Procedure

5.5.1 Dis-Assembly

- Operate collar safe-lok system to release the collar. Loosen the collar and lock in the up position
- Remove the top sub from the bottom sub
- Remove 4 Stop Pins and washers from the split collar on the top sub
- Loosen split rings from collar and remove from split collar. Remove split collar from the top sub
- Remove 4 Stop Pins and washers from the split collar on the bottom sub
- Loosen split rings from collar and remove from split collar. Remove split collar from the bottom sub
- Remove the saver block and test port from the bottom sub
- Remove the circlip holding the equalisation valve in and remove the equalisation valve
- Remove and discard all 'O' rings
- Degrease and clean all components
- Inspect for signs of damage
- Fit thread protectors

5.5.2 Re-Assembly

- Remove thread protectors
- Inspect all threads for damage and clean with wire brush
- Fit internal and external 'O' rings to the bottom sub
- Fit 'O' rings to the equalisation valve and test port
- Grease equalisation valve 'O' rings and thread
- Fit equalisation valve to bottom sub tighten down and fit circlip



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- Grease test port 'O' ring and fit to bottom sub using 2 screws (0.75"/1.9cm length) and washers
- Fit saver block over test port on bottom sub using 2 screws (1.25"/3cm length) and washers
- Slide the Split Collar over the bottom sub, make up the two halves of the split ring and tighten down until the ends are flush with the collar. Back off slightly to align the holes
- Insert 4 Stop Pins and washers
- Slide the Split Collar over the top sub, make up the two halves of the split ring and tighten down until the ends are flush with the collar. Back off slightly to align the holes
- Insert 4 Stop Pins and washers
- Operate Collar Safe-Lok system and hold collar in the up position
- Grease OD of top sub and internal 'O' rings of the bottom sub
- Make up the top sub to the bottom sub release the collar and tighten check operation of the collar safe-lok system to ensure the collar is locked in position



5.6 Maintenance Record Sheet

Date Performed	Type of Maintenance	Performed By	Verified By	Comments

Table 2: Maintenance Record

6 Testing

All testing is to be carried out in the designated test area and by suitably qualified and competent personnel.

WARNING: Trapped air requires considerable time to compress and when it is compressed is highly dangerous. It has enough stored energy to separate parts with considerable force.

- On completion of reassembly fit the appropriate test caps to either end of the Fast Test sub and NPT plug to test port
- Ensure equalisation valve is closed
- Fill with test fluid and bleed off any air in the system
- Apply a pressure of 500 psi and ensure pressure holds for a minimum of 10 minutes
- Increase pressure to 10,000 psi (Maximum Working Pressure), allow to stabilise and maintain this pressure until it is evident there are no apparent leaks.
- Bleed off pressure, drain test fluid and dry
- Remove test caps and plug
- Apply coating of de-watering solution to protect the bore and threads
- Fit thread protectors

On completion of all maintenance ensure the maintenance record sheet (5.6) is completed



7 Parts List and Drawings

Item Number	Part Number	Quantity	Description
1	117-2291-480	1	TOP SUB
2	117-2290-480	1	BOTTOM SUB
3	110-2053-480	2	COLLAR 9-4 (SPLIT TYPE)
4	110-2054-480	2	SPLIT RING (9-4)
5	190-1718-316	1	Equalization Valve
6	900-1631-480	1	TEST PORT
7	110-2329-3A4	8	STOP PIN
8	SHC-0583-3A4	2	Soc Hd Cap Size 1/2 Length 0.75 in
9	WNL-0580-STL	12	Nord Lock Washer (M12)
10	117-2166-STL	1	CIRCLIP INTERNAL 19mm (DHO-19)
11	SHC-0592-STL	2	Soc Hd Cap Size 1/2 Length 2.5 in
12	801-0119-V90	1	O-Ring - B.S Size 119
13	801-0438-V90	3	O-Ring - B.S Size 438
14	801-0108-V90	1	O-Ring - B.S Size 108
15	117-2150-N66	1	SAVER-BLOCK
100	910-2155-N66	1	9-4 ACME MALE PROTECTOR
101	910-2156-N66	1	9-4 ACME FEMALE PROTECTOR

Table 3: Parts List

Note 1: Thread protectors (items 100 and 101) not shown on Assembly Drawing (Figure 6)

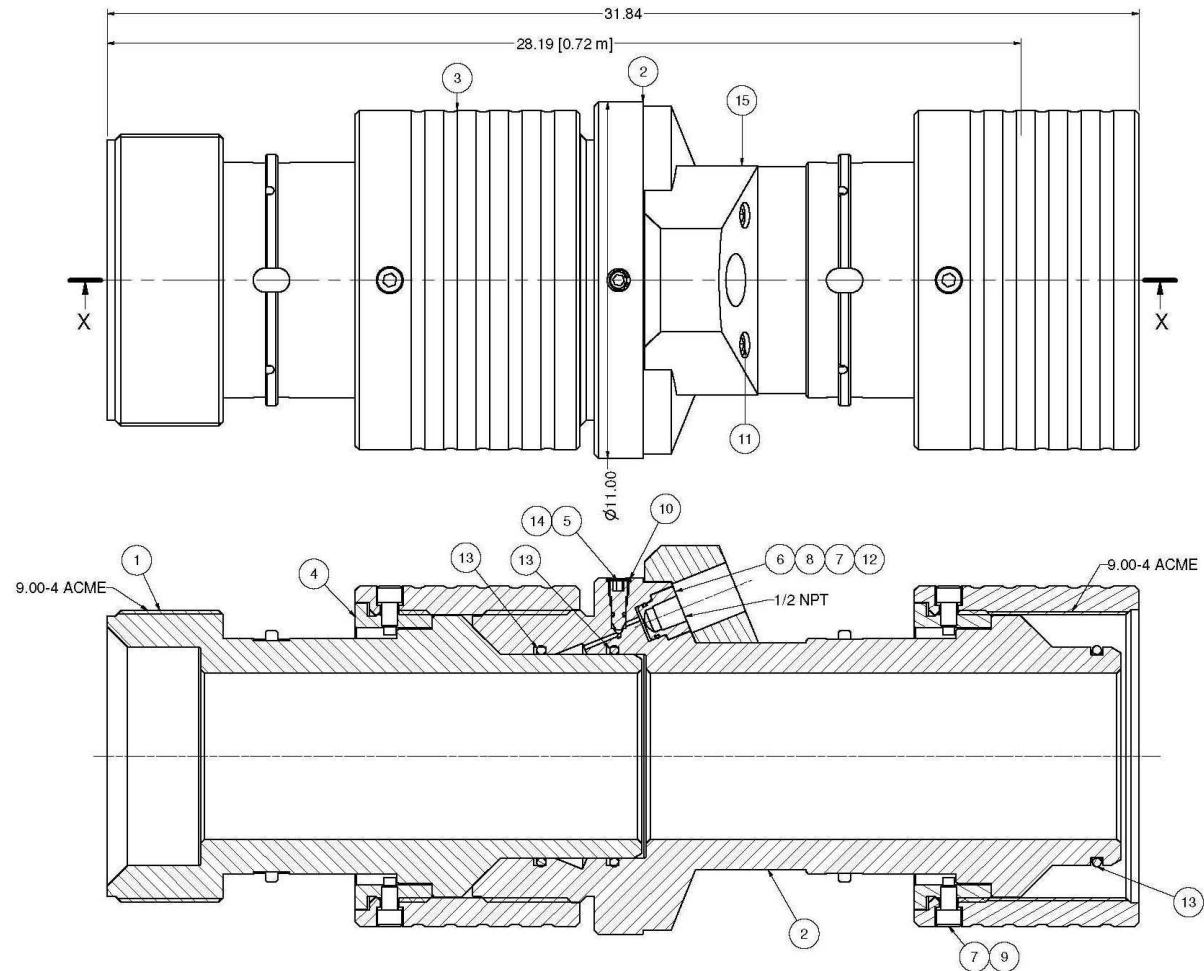


Figure 6 : Assembly Drawing

8 Spares

Use only spares supplied or approved by Phuel Oil Tools Ltd.

It is recommended that sufficient quantities of the following spares be maintained to ensure that the equipment is always available when required.

Elastomeric spares are supplied in Viton material as standard. Many other materials are available please specify when ordering.

Part No	Qty	Description	Comments
801-0119-V90	1	O-Ring - B.S Size 119	
801-0438-V90	3	O-Ring - B.S Size 438	
801-0108-V90	1	O-Ring - B.S Size 108	

Table 4 : Redress Kit Part No RDK-2349-HH0

8.1.1 Individual Items

Individual items may be ordered as required using the part number specified

Note: O-Rings conform to industry standards and may be substituted with those from other suppliers -- **at the sole risk of the user.**